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WOOD ANATOMY OF THE NEOTROPICAL SAPOTACEAE XXVIII  
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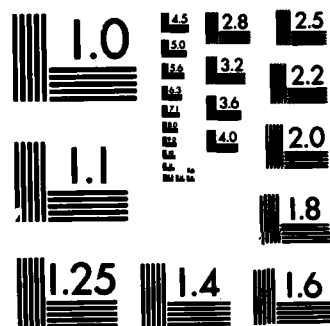
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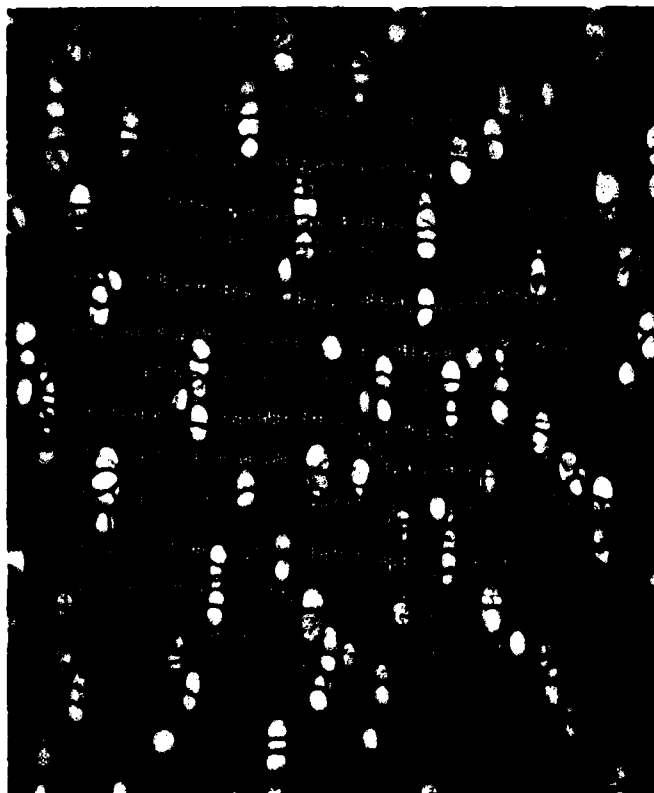
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**WOOD ANATOMY  
OF THE  
NEOTROPICAL SAPOTACEAE  
XXVIII. LABATIA**

RESEARCH PAPER FPL 416

FOREST PRODUCTS LABORATORY  
FOREST SERVICE  
U.S. DEPARTMENT OF AGRICULTURE  
MADISON, WIS.

OCTOBER 1982



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## Abstract

The genus Labatia, first described in 1788, was maintained as a distinct entity until the 1930's when it was submerged in Pouteria. In 1972 it was reestablished as the new genus Neolabatia and stated to be very closely related to the earlier described genus Pseudolabatia. Anatomically, Pseudolabatia is here regarded as a synonym of Labatia and, because of the appreciable differences in wood anatomy, Labatia is here regarded as distinct from Pouteria.

## Preface

The Sapotaceae form an important part of the ecosystem in the neotropics; for example, limited inventories made in the Amazon Basin indicate that this family makes up about 25 percent of the standing timber volume there. This would represent an astronomical volume of timber but at present only a very small fraction is being utilized. Obviously, better information would help utilization--especially if that information can result in clear identification of species.

The Sapotaceae represent a well-marked and natural family but the homogeneous nature of their floral characters makes generic identification extremely difficult. This in turn is responsible for the extensive synonymy. Unfortunately, species continue to be named on the basis of flowering or fruiting material alone and this continues to add to the already confused state of affairs.

This paper on Labatia is the twenty-eighth in a series describing the anatomy of the secondary xylem of the neotropical Sapotaceae. The earlier papers, all by the same author and under the same general heading, include:

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|--|---------------------------------------|
| I. Bumelia--Res. Pap. FPL 325          | XV. Sandwithiodoxa--Res. Pap. FPL 359 |
| II. Mastichodendron--Res. Pap. FPL 326 | XVI. Paralabatia--Res. Pap. FPL 360   |
| III. Dipholis--Res. Pap. FPL 327       | XVII. Gambeya--Res. Pap. FPL 361      |
| IV. Achrouteria--Res. Pap. FPL 328     | XVIII. Gomphiluma--Res. Pap. FPL 362  |
| V. Calocarpum--Res. Pap. FPL 329       | XIX. Chromolucuma--Res. Pap. FPL 363  |
| VI. Chloroluma--Res. Pap. FPL 330      | XX. Manilkara--Res. Pap. FPL 371      |
| VII. Chrysophyllum--Res. Pap. FPL 331  | XXI. Barylucuma--Res. Pap. FPL 372    |
| VIII. Diploon--Res. Pap. FPL 349       | XXII. Pradosia--Res. Pap. FPL 373     |
| IX. Pseudoxythece--Res. Pap. FPL 350   | XXIII. Gayella--Res. Pap. FPL 374     |
| X. Micropholis--Res. Pap. FPL 351      | XXIV. Ecclinusa--Res. Pap. FPL 395    |
| XI. Priurella--Res. Pap. FPL 352       | XXV. Ragala--Res. Pap. FPL 396        |
| XII. Neoxythece--Res. Pap. FPL 353     | XXVI. Myrtiluma--Res. Pap. FPL 397    |
| XIII. Podoluma--Res. Pap. FPL 354      | XXVII. Sarcaulus--Res. Pap. FPL 398   |
| XIV. Elaeoluma--Res. Pap. FPL 358      |                                       |

Publication in this manner will afford interested anatomists and taxonomists the time to make known their opinions and all such information is hereby solicited. At the termination of this series the data will be assembled into a comprehensive unit.

# WOOD ANATOMY OF THE NEOTROPICAL SAPOTACEAE

## XXVIII. LABATIA

By

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### Introduction

The genus Labatia was first described by Swartz in 1788 and was adopted by the early students of the Sapotaceae that included A. deCandolle, Benthams and Hooker, Hartog, Radlkofer, Engler, Baillon, and Dubard. In the late 1930's, through the studies of Baehni, Eyma, and Lam, it became a synonym of Pouteria and has since been maintained in this status by most authors. Of the contemporary authors, Aubréville (1,2)<sup>3/</sup> reinstated Labatia to generic status while Blackwell (5) and Pilz (8), following Cronquist (6), have adopted the use of Pouteria. In 1936, Eyma (7) made the statement that "The name Labatia Swartz is antedated by Labatia Scopoli which is now regarded as a synonym of Ilex (Aquifoliaceae)." Aubréville (1) had noted this statement of Eyma and maintained Labatia Swartz in his subsequent paper (2). However, in 1972, Aubréville (3) published the nomen novo Neolabatia and transferred six species of Labatia to his new genus. Because Labatia of Swartz is a conserved name, Aubréville's Neolabatia must be invalidated.

Anatomical descriptions of Labatia are nonexistent and Record (9) in his study of the American Sapotaceae did not describe the anatomy and stated only that "The woods bear a close resemblance to those of Paralabatia." The only wood specimens available to Record at that time were two specimens from Panama, Labatia stylosa (Cooper 509) and L. euryphylla (Cooper 611), and a third specimen from Cuba named Labatia aristata (Br. Leon 13315). The specimens from Panama are typically Labatia on the basis of their anatomy but the Cuban specimen has all the attributes of Paralabatia and this author has referred this

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1/ Pioneer Research Unit, Forest Products Laboratory.

2/ Maintained at Madison, Wis., in cooperation with the University of Wisconsin.

3/ Underlined numbers in parentheses refer to literature cited at the end of this report.

specimen to the latter genus on anatomical grounds. The Cuban specimen collected by Br. Leon (13315) was not cited by Baehni (4) or by Cronquist (6) and may possibly be a sterile specimen which was not considered by these authors.

In 1961, Aubréville (1) published the description of a new genus Pseudolabatia Aubr. and Pellegr. based on Labatia psammophila Mart. resulting in the new combination, Pseudolabatia psammophila (Mart.) Aubr. To this were added four additional species segregated from Pouteria and one new species.

While Aubréville admitted that, although very close to Labatia, Pseudolabatia differed with respect to leaf nervation and characters of the seed, he separated these genera in his key on the basis of stamen insertion; in Pseudolabatia the stamens were attached near the middle of the corolla tube while in Labatia they were attached toward the base of the tube. This author is not qualified to judge the validity of this character but it would appear to be rather difficult to assess in these very small flowers.

Anatomically, the woods attributed to Pseudolabatia and Labatia cannot be separated and are considered here as belonging to Labatia, which comprises a limited grouping of small to large trees easily separated from Pouteria.

Most of the species of Labatia range from Panama and Venezuela to the Guianas and Brazil. The generic type, L. sessiliflora Swartz, is known from Haiti and the Dominican Republic. Wood of the generic type was not available for this study and appears never to have been collected.

### Description

This study is based on the examination of 50 wood specimens: 9 were specifically named and represented by 16 specimens; the remaining 34 specimens were assigned here on the basis of wood anatomy. (See table 1 for data pertinent to the wood specimens used in this study.) It is assumed that when Pseudolabatia is submerged in Labatia the appropriate new combinations will be made.

**General:** Wood yellowish-brown (straw-colored) with no apparent differentiation of heartwood and sapwood. Growth rings vague and indistinct. Wood hard, heavy, straight-grained with little luster. Specific gravity (at a moisture content of 6 to 7 pct) ranges from 0.72 to 1.11 for individual specimens with a generic average of 0.94. Bark mottled gray and red brown; smooth; in cross section laminated with the inner bark very much darker than the outer; commonly 1 to 2 mm thick. In two specimens of Labatia glomerata the bark was 4 to 6 mm thick and distinctly furrowed; in two unassigned specimens, N. A. Rosa 1848 and Silva and Jangoux 442, the bark was 3 to 4 mm thick and the laminations were distinct to the unaided eye. In the other specimens the laminations can be seen only with a hand lens in cross sections but can be observed readily when the face of the bark is cut obliquely, exposing the dark- and light-colored bands. Froth negative.

### Anatomical:

Pores essentially diffuse (figs. 1,3) in most specimens but tending toward an echelon arrangement in others. Solitary pores are present but the majority are in radial multiples of 2 to 4 and occasionally to 6 and 7; longer multiples (as they appear under a hand lens) are found to be separated by vascular tracheids, parenchyma, or both when viewed under the microscope. Maximum pore diameter of individual specimens ranges from 63 to 181  $\mu\text{m}$  with an overall average of 100  $\mu\text{m}$ ; largest pores were observed in N. A. Rosa 593 (L. cuprea).

Vessel member length averages 640  $\mu\text{m}$  for all specimens examined with a range of 410 to 810  $\mu\text{m}$ . Intervessel pitting 3 to 4(5)  $\mu\text{m}$  in diameter. Tyloses commonly thin-walled but may be thick-walled in the denser wood. Perforation plates simple.

Axial parenchyma typically banded (figs. 1,3), under a hand lens appearing to restrict the pores to the zones between the bands. The individual bands are irregularly (1) 2 to 3 seriate and infrequently to 5 to 6 seriate as in L. glomerata (fig. 3). Brown organic desposits present but never abundant. Silica particles occasionally present and then usually restricted to cells containing brown deposits. Crystals were not found in any of the specimens examined.

Wood rays commonly 1 to 3 seriate and infrequently 4 to 5 seriate (figs. 3,4); heterocellular. The maximum body height of the 1 to 5 seriate portions ranges from 79 to 946  $\mu\text{m}$ ; the 4 to 5 seriate rays are generally the highest. Vessel-ray pitting irregular in shape and size but the majority tend to be linear. Brown deposits present but usually limited in quantity. Lateral walls of the square and erect marginals (radial section) finely pitted and in some specimens appear quite smooth. Silica particles common to abundant in the tabular, square and upright cells; occurring in cells with or without brown deposits. Crystals not found in any specimen examined.

Wood fibers thick-walled; the fiber length averages for all specimens ranging 0.92 to 1.55 mm with an overall average of 1.27 mm. Vascular tracheids present but never abundant.

Silica content as determined by the chemical analysis of 36 wood specimens ranged from 2.32 to 0.07 percent; the highest value was found in L. glomerata (Capucho 578) and the lowest in L. stylosa (Cooper 509); average of all analyses was 0.78 percent. Silica analyses were contributed by Martin Wesolowski, Chemist, FPL.

Diagnostic features: Wood yellow-brown or straw-colored; parenchyma banded; pores essentially diffuse or occasionally with a tendency toward an echelon arrangement; pitting on lateral walls of the square and erect marginal cell of the wood rays very finely pitted; intervessel pitting 3 to 4  $\mu\text{m}$ ; silica present.

### Notes

1. The specimens used in this study were found under a variety of generic names including Labatia, Chrysophyllum, Chloroluma, Lucuma, Nemaluma, Neopometia, Pouteria, Pseudolabatia, Richardella, Radlkoferella, and simply as Sapotaceae.
2. The new combination Labatia euryphylla (Standl.) Standl. (11) was made in 1962 being originally described as Lucuma euryphylla Standl. Baehni (4) in 1942 made the new combination Pouteria euryphylla (Standl.) Baehni and this name was retained by subsequent authors Blackwell (5), Cronquist (6), and Pilz (8). This species is based on Cooper 611 and is known only from the type collection in Panama. Pilz (8) noted that this species is most likely related to the species Aubréville placed in his new genus Pseudolabatia.
3. Labatia sambuensis Pittier and L. standleyana Pittier were both cited by Standley (10) but only the wood of the latter was available for this study. Labatia standleyana is now regarded as a synonym of L. stylosa (Pierre) Aubr. and was represented in this study by Cooper 509 from Panama.
4. Labatia cuprea (N. A. Rosa 593) differs from Rodrigues and Lima 2532 in several respects but particularly with respect to pore size (this specimen has the largest maximum pore size encountered in this group). The herbarium sheet IAN 151195 should be checked.
5. Pouteria gardnerana (A.DC.) Radlk. (Froes 150) is very similar to Labatia glomerata. This number was not cited by Baehni (4). It possibly may be a sterile specimen and is not listed in table 1.
6. It is believed that many of the unassigned specimens are sterile and this would account for the many generic names that have been applied here in item 1.



### Literature Cited

1. Aubréville, Andre.  
1961. Notes sur des Poutériées Américaines. *Adansonia* N.s. 1(2):161-162.
2. Aubréville, Andre.  
1964. Sapotacées. *Adansonia* Mémoire No. 1.
3. Aubréville, Andre.  
1972. Sapotaceae. *Memoirs of The New York Botanical Garden* 23:200-227.
4. Baehni, Charles.  
1942. Mémoires sur les Sapotacées, Le Genre Pouteria. *Candollea* IX:194-474.
5. Blackwell, Will H.  
1968. Flora of Panama, Family 154, Sapotaceae. *Ann. Missouri Bot. Gard.* 55(2):145-169.
6. Cronquist, Arthur.  
1946. Studies in the Sapotaceae-II. Survey of the North American genera. *Lloydia* 9(4):241-292.
7. Eyma, P. J.  
1936. Notes on the Guiana Sapotaceae. *Rec. Trav. Bot. Neerl.* 33:163-166.
8. Pilz, George E.  
1981. Sapotaceae of Panama. *Ann. Missouri Bot. Gard.* 68(1):172-203.
9. Record, Samuel J.  
1939. The American woods of the family Sapotaceae. *Trop. Woods* 59:36.
10. Standley, Paul C.  
1925. An enumeration of the Sapotaceae of Central America. *Trop. Woods* 4:8.
11. Standley, Paul C.  
1932. Additions to the Sapotaceae of Central America. *Trop. Woods* 31:43.

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Table 1.--Wood specimens of Labatia described in this study

Species	Collector and number	Source	Wood collection and number <sup>1/</sup>
<u>cuprea</u> (Huber)	Rodrigues and Lima 2532 N. A. Rosa 593	Brazil Brazil	INPA 943 IAN 151195
<u>euryphylla</u> (Standl.)	Cooper 611	Panama	SJR 12244
<u>filipes</u> (Eyma)	For. Dept. 3759	Guyana	MAD 4940
<u>glomerata</u> (Miq.) Radlk.	Capucho 578 Froes 195 Krukoff 6632	Brazil Brazil Brazil	MAD 20482 A 27395 SJR 36783
<u>macrocarpa</u> Mart.	Capucho 405 Maguire et al. 51949 N. A. Rosa 149	Brazil Brazil Brazil	MAD 23680 MAD 21608 IAN 142493
<u>parviflora</u> Pittier	Froes 204 Froes 226	Brazil Brazil	A 27399 A 27410
<u>penicillata</u> (Baehni)	For. Dept. 3411	Guyana	SJR 43782
<u>raoulantonina</u> (Aubr. and Pellegr.)	Coehlo 1897 Museu Goeldi 68071	Brazil Brazil	INPA 292 MG
<u>stylosa</u> (Pierre) Aubr.	Cooper 509	Panama	SJR 12128
unassigned	Acosta-Solis 11706 Capucho 355 Ducharne 42 Froes 48 Froes 67 Froes 172 Froes 236 Froes 281 Froes 454	Ecuador Brazil Venezuela Brazil Brazil Brazil Brazil Brazil Brazil	SJR 45419 MAD 9886 SJR 13642 A 27474 A 27354 A 27387 A 27416 A 27436 A 27508

Table 1.--Wood specimens of Labatia described in this study--con.

Species	Collector and number	Source	Wood collection and number <sup>1/</sup>
unassigned--con.	Froes 577	Brazil	A 27527
	Froes 31797	Brazil	IAN 87753
	Krukoff 4888	Brazil	MAD 18580
	Krukoff 5034	Brazil	MAD 18608
	Krukoff 5106	Brazil	MAD 32863
	Krukoff 5602	Brazil	MAD 18732
	Krukoff 6145	Brazil	MAD 12326
	Krukoff 6616	Brazil	MAD 32873
	Krukoff 6793	Brazil	MAD 12656
	Lindeman 4837	Surinam	MAD 32935
	Museu Goeldi 68072	Brazil	MG
	Oliveira, E. 3001	Brazil	IAN 115785
	Oliveira, E. 4465	Brazil	IAN 124650
	Pires 7308	Brazil	IAN 101681
	Plowman and Rosa 9457	Brazil	MG
	Plowman and Rosa 9794	Brazil	MG
	Rosa, N. A. 1219	Brazil	MG 728
	Rosa, N. A. 1293	Brazil	MG
	Rosa, N. A. 1308	Brazil	MG
	Rosa, N. A. 1838	Brazil	MG
	Rosa, N. A. 1846	Brazil	MG 1455
	Rosa, N. A. 1848	Brazil	MG 750
	Silva, M. G. 3598	Brazil	MG 1517
	Silva, N. T. 3134	Brazil	IAN 134990
	Silva and Jangoux 442	Brazil	MG

<sup>1/</sup> A = Harvard University, Cambridge, Mass.; IAN = Instituto Agronomico do Norte, Belem, Brazil; INPA = Instituto Nacional de Pesquisas da Amazonia, Manaus, Brazil; MAD = Forest Products Laboratory, Madison, Wis.; MG = Museu Goeldi, Belem, Brazil; SJR = Samuel J. Record Memorial Collection, formerly at Yale University but now housed at Madison, Wis.

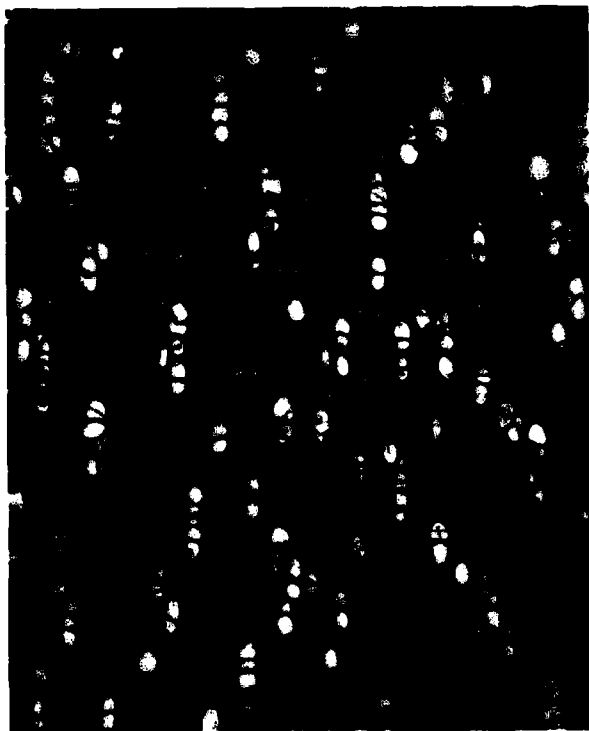


Figure 1.--Labatia macrocarpa, pore and parenchyma arrangement at 30X (Maguire et al. 51949).

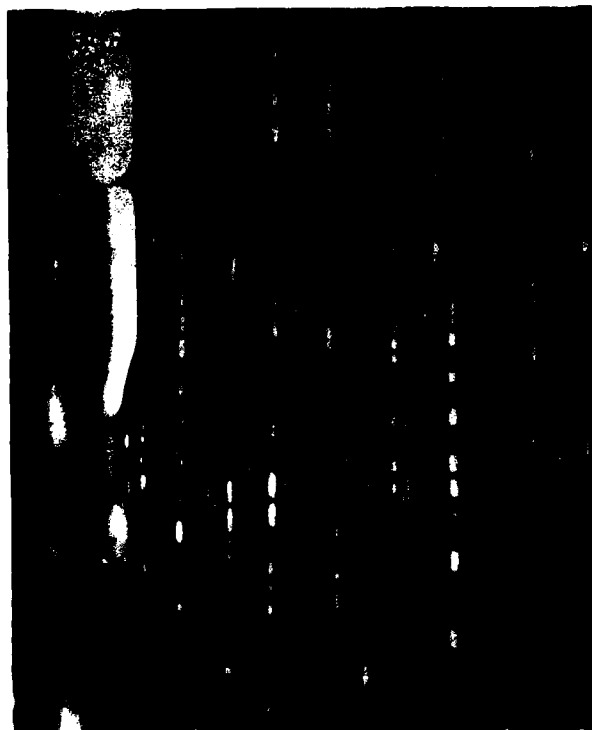


Figure 2.--Same as figure 1, narrow rays with low body height at 110X.

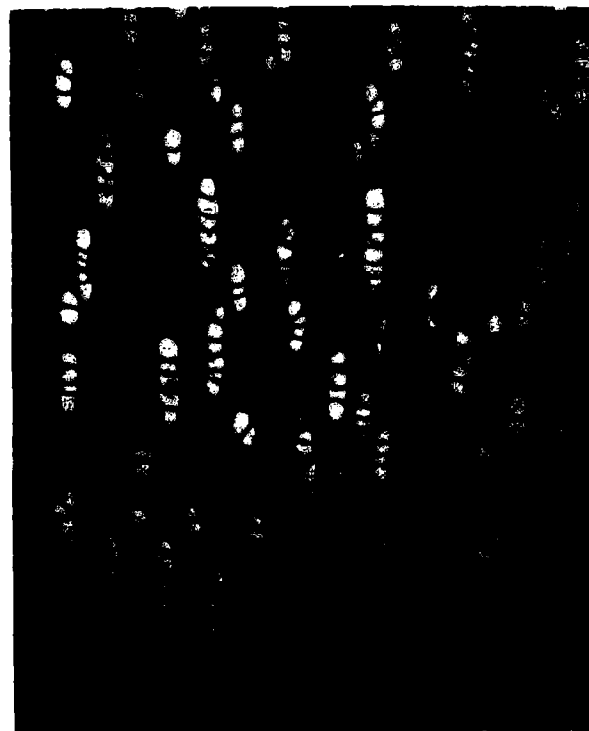


Figure 3.--L. glomerata, pore and parenchyma arrangement more conspicuous at 30X (Capuc... 78).



Figure 4.--Same as figure 3, wider rays and high body height at 110X.

U.S. Forest Products Laboratory

Wood anatomy of the neotropical Sapotaceae: XXVIII.

Labatia, by B. F. Kukachka, FPL.

8 p. (USDA For. Serv. Res. Pap. FPL 416).

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